Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-289

Tactical Tomahawk RGM-109E/UGM-109E Missile (TACTOM)

As of FY 2019 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator info Available at this time.

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name
Tactical Tomahawk RGM-109E/UGM-109E Missile (TACTOM)

DoD Component
Navy

Responsible Office

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Date Assigned: September 18, 2015

References

SAR Baseline (Production Estimate)

Navy Acquisition Executive (NAE) Approved Acquisition Program Baseline (APB) dated August 3, 2004

Approved APB

Navy Acquisition Executive (NAE) Approved Acquisition Program Baseline (APB) dated February 2, 2018

Mission and Description

The Tactical Tomahawk RGM-109E/UGM-109E Missile (TACTOM) counters threats against United States forces by destroying fixed and mobile targets, which include command, control and logistic systems, industrial and other high value targets, and fixed and mobile defense systems. The Tomahawk Weapon System (TWS) consists of the TACTOM missile, the Theater Mission Planning Center (TMPC), and the Tactical Tomahawk Weapons Control System (TTWCS). TACTOM is an ACAT IC program, TMPC is an ACAT II program, and TTWCS is an ACAT III program. TACTOM provides major modernization to the existing Tomahawk technology by increasing responsiveness and flexibility at a more affordable production unit cost.

Key elements of the TACTOM design are an improved navigation and guidance computer, improved anti-jam Global Positioning System capability, improved responsiveness and flexibility through two-way satellite communications for in-flight re-targeting, a loiter capability, and the ability to send a single-frame Battle Damage Indication Image of over-flown areas prior to impact. Modern manufacturing techniques and Commercial Off-the-Shelf/Government Off-the-Shelf hardware provide this improved capability. Additionally, the life cycle costs are significantly reduced by extending the recertification interval from eight years for the currently fielded Block III Tomahawk to 15 years for TACTOM. TACTOM will maximize the use of existing TWS program and logistic support.

Executive Summary

Program Highlights Since Last Report

This is the final SAR submission for the TACTOM program.

Pursuant to section 2432 of title 10, United States Code, this is the final SAR submission for TACTOM, because the program is 90% or more delivered.

TACTOM has exercised 14 FRP contracts to date, the most recent occurring in FY 2017. The FY 2017 FRP 14 contract was awarded for a total of 196 Vertical Launch System All-Up-Rounds. FY 2017 Requested Additional Appropriations funding used to fund 96 of these missiles.

As of January 9, 2018, a total of 4,050 TACTOM missiles have been delivered, which includes 89 FMS missiles for the United Kingdom.

The FY 2018 Overseas Contingency Operations (OCO) funds are planned to replenish 66 TACTOM missiles, five of which were expended in October 2016 and 61 were expended in April 2017. Baseline funding is included within the budget request to procure 34 missiles in combination with the FY 2018 OCO procurement for a total of 100 missiles.

TACTOM deliveries by Raytheon Missile Systems (RMS), Tucson, Arizona, are consistently ahead of contract delivery schedule. As of December 31, 2017 RMS achieved 102 consecutive months of meeting or exceeding the contracted TACTOM missile delivery requirements. The current combined Block III Tomahawk and TACTOM fleet inventory is sufficient to satisfy projected CY 2017 U.S. Navy operational load-outs.

In addition to limited missile procurements, FY 2018 funding supports TACTOM Advanced Communications Architecture kit procurement and associated support costs, production line shutdown, and support equipment.

FY 2018 funding also supports the non-recurring engineering across the prime contractor and sub-tiered vendor base required for the standup of the Tactical Tomahawk recertification line. Efforts include tear down, replacement of obsolete components, replace components that are service life limited, recertify components, reassemble and test. This process will result in the validation and verification of the Tactical Tomahawk recertification line in preparation for induction of Fleet assets commencing in FY 2019. The program is also focusing on adding modernized capabilities such as, Joint Multiple Effects Warhead, Maritime Strike Tomahawk, and Military Code Global Positioning System.

There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
June 1998	Milestone II development Contract Award.
August 2002	First Development Flight Test successfully completed.
October 2002	LRIP-1 contract awarded for 25 missiles.
January 2003	LRIP-2 contract awarded for 167 missiles.
October 2003	Technical Evaluation completed.
March 2004	Successful Operational Evaluation (OPEVAL) completed. OPEVAL included two surface and two underwater test launches, numerous mission planning exercises and a complete 96-hour end-to-end operational scenario.
March 2004	LRIP-3 contract awarded for 210 missiles. Late in FY 2003, a Congressional plus-up provided for an LRIP-3 procurement to accelerate the replenishment of inventory lost during Operation Iraqi Freedom.
May 2004	IOC achieved.
August 2004	Entered the Production and Deployment Phase based on Milestone III ADM issued by the Assistant Secretary of the Navy (Research, Development, and Acquisition).
August 2004	Operational Requirements Document for Tomahawk Weapons Systems Baseline IV signed. TACTOM is authorized in Chapter 2 of this system level document.
August 2004	FRP contract awarded. A Multi-Year Procurement contract (FY 2004-FY 2008) was signed with Raytheon Missile Systems for a base plus four options, for up to 2200 Block IV Tactical Tomahawk AUR missiles.
September 2004	An in depth Production Verification Test of randomly selected Block IV Tactical Tomahawk AUR LRIP missile was successfully completed at the Naval Surface Weapons Center, Indian Head Division.
March 2009	FRP Contract awarded for base year plus two options, for up to 1050 Block IV Tactical Tomahawk AUR missiles.
September 2011	Additional FY 2011 funding was received through OMNIBUS reprograming action to replenish the 221 Tomahawk missile expditures during Operation Odyssey Dawn.
June 2012	FRP Contract awarded for base year plus one option to procure up to 740 Block IV Tactical Tomahawk AUR missiles.

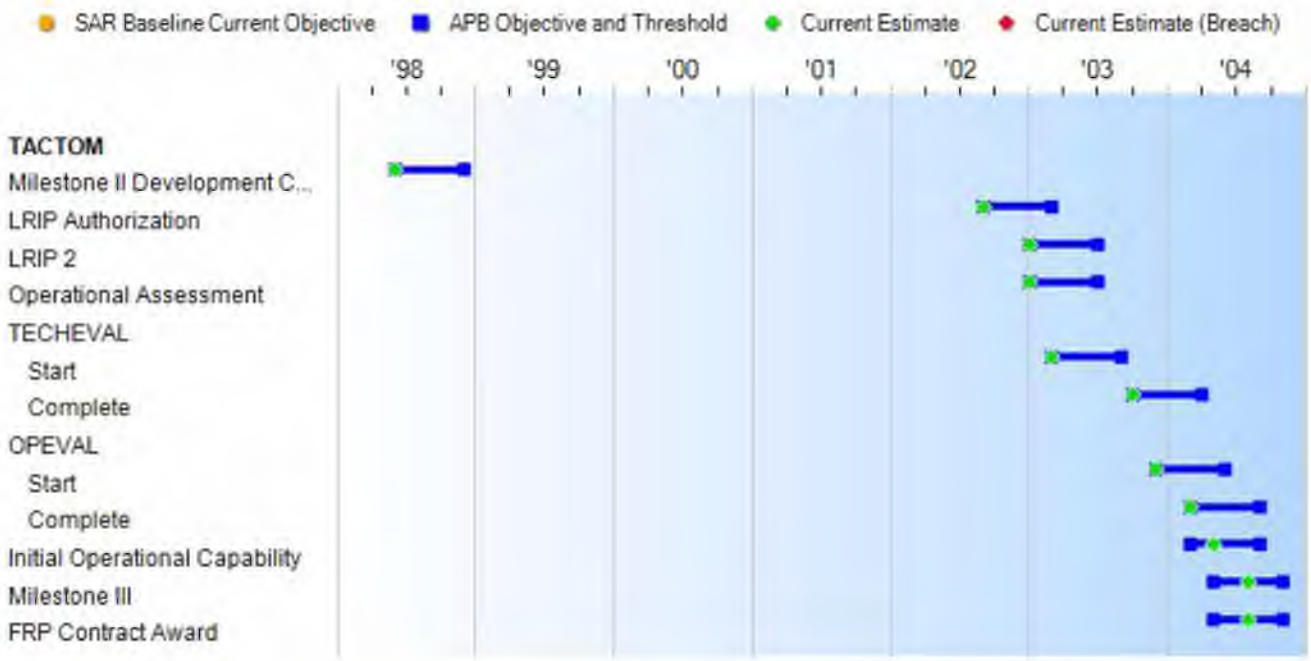
September 2014	During Operation Inherent Resolve (OIR), the U.S. Navy fired 47 TACTOM missiles from aboard the USS Arleigh Burke and USS Philippine Sea. Additional FY 2015 OCO supplemental funds were appropriated by Congress for the replenishment of those combat expenditures.
September 2014	September 24, 2014: FRP Contract award for 231 Block IV Tactical Tomahawk AUR missiles. The FY 2014 procurement includes 196 surface and subsurface launched AURs, 20 Torpedo Tube Launched AURs as part of the UK FMS Case, and 15 surface AURs (FY 2013 funded through Buy-to-Budget). The FY 2015 option includes 96 surface AURs and ten surface AURs (FY 2014 funded through Buy-to-Budget).
September 2014	September 24, 2014: Contract awarded for FRP-11 (231 missiles), and FRP-12 (214 missiles). All deliveries were scheduled from November 2015 to August 2017.
December 2016	Contract award for FRP-13 (214 missiles to include the 47 OCO Missiles). All deliveries are scheduled from December 2017 to August 2018.
November 2017	Contract award for FRP14 196 missiles plus identified spares. All deliveries are scheduled to be complete in August 2019.

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
O&S Cost		☐
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Schedule



Schedule Events				
Events	**SAR Baseline Production Estimate**	**Current APB Production Objective/Threshold**		**Current Estimate**
Milestone II Development Contract Award	Jun 1998	Jun 1998	Dec 1998	Jun 1998
LRIP Authorization	Sep 2002	Sep 2002	Mar 2003	Sep 2002
LRIP 2	Jan 2003	Jan 2003	Jul 2003	Jan 2003
Operational Assessment	Jan 2003	Jan 2003	Jul 2003	Jan 2003
TECHEVAL				
Start	Mar 2003	Mar 2003	Sep 2003	Mar 2003
Complete	Oct 2003	Oct 2003	Apr 2004	Oct 2003
OPEVAL				
Start	Dec 2003	Dec 2003	Jun 2004	Dec 2003
Complete	Mar 2004	Mar 2004	Sep 2004	Mar 2004
Initial Operational Capability	Mar 2004	Mar 2004	Sep 2004	May 2004
Milestone III	May 2004	May 2004	Nov 2004	Aug 2004
FRP Contract Award	May 2004	May 2004	Nov 2004	Aug 2004

Change Explanations

None

Acronyms and Abbreviations

OPEVAL - Operational Evaluation
TECHEVAL - Technical Evaluation

Performance

Performance Characteristics					
SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Demonstrated Performance	Current Estimate	
MR (%)					
.90	.90	.86	.92	.92	(Ch-1)
CR (%)					
.96	.96	.94	.95	.95	(Ch-2)

Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

Operational Requirements Document (ORD) #641-76-04 dated August 11, 2004

Change Explanations

(Ch-1) Mission Reliability estimate has increased from .91 to .92 which continues to exceed objective.
(Ch-2) Cruise Reliability current estimate has decreased from .96 to .95 which continues to exceed threshold.

Notes

The data set for CR and MR includes TACTOM Flight Tests, combat expenditures, and accounting for corrective actions in the missile inventory. Test events include Operational Evaluation, Technical Evaluation, TACTOM Penetrating Vehicle flights, contractor flights, ground tests, and combat expenditures. Corrected failures that meet all of the following criteria have been removed from the data set: root cause of a failure is known, the failure mode is eliminated by hardware or software modification, the modification has been appropriately verified by test, and the modification has been implemented throughout the entire missile population.

Acronyms and Abbreviations

CR - Cruise Reliability
MR - Mission Reliability

Track to Budget

RDT&E

Appn		BA	PE
Navy	1319	07	0204229N

Project	Name	
0545	Tomahawk	(Sunk)
2658	Tomahawk Mssn Planning Ctr	(Sunk)
2659	Tomahawk Mssn Planning Ctr	(Sunk)
4032	A2AD	(Shared)

Notes: Current Estimate includes RDT&E funding for modernization efforts in FY 2014 - FY 2020 to mitigate navigation and communication obsolescence.

Notes

RDT&E funding for TACTOM modernization is a subset of the total RDT&E funding within PE 0204229N.

Procurement

Appn		BA	PE
Navy	1507	02	0204229N

Line Item	Name	
2101	TOMAHAWK	(Shared)

Notes: TACTOM

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 1999 $M			BY 1999 $M	TY $M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	564.9	622.0	684.2	629.2	581.0	660.9	670.7
Procurement	2412.4	4784.2	5262.6	4841.0	2709.3	6169.1	6253.2
Flyaway	--	--	--	4717.7	--	--	6086.8
Recurring	--	--	--	4662.5	--	--	6020.3
Non Recurring	--	--	--	55.2	--	--	66.5
Support	--	--	--	123.3	--	--	166.4
Other Support	--	--	--	123.3	--	--	166.4
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2977.3	5406.2	N/A	5470.2	3290.3	6830.0	6923.9

Current APB Cost Estimate Reference

AIR-4.2 Cost Estimate dated June 13, 2017

Cost Notes

In accordance with Section 842 of the National Defense Authorization Act for FY 2017, which amended title 10 U.S.C. § 2334, the Director of Cost Assessment and Program Evaluation, and the Secretary of the military department concerned or the head of the Defense Agency concerned, must issue guidance requiring a discussion of risk, the potential impacts of risk on program costs, and approaches to mitigate risk in cost estimates for MDAPs and major subprograms. The information required by the guidance is to be reported in each SAR. This guidance is not yet available; therefore, the information on cost risk is not contained in this SAR.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	10	10	10
Procurement	2780	4429	4429
Total	2790	4439	4439

Cost and Funding

Funding Summary

Appropriation Summary FY 2019 President's Budget / December 2017 SAR (TY$ M)									
Appropriation	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
RDT&E	641.8	20.0	4.8	4.1	0.0	0.0	0.0	0.0	670.7
Procurement	5149.4	206.8	46.1	32.6	35.2	66.8	57.7	658.6	6253.2
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2019 Total	5791.2	226.8	50.9	36.7	35.2	66.8	57.7	658.6	6923.9
PB 2018 Total	5791.2	223.3	51.5	38.6	35.5	52.1	41.5	596.3	6830.0
Delta	0.0	3.5	-0.6	-1.9	-0.3	14.7	16.2	62.3	93.9

Quantity Summary FY 2019 President's Budget / December 2017 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
Development	10	0	0	0	0	0	0	0	0	10
Production	0	4329	100	0	0	0	0	0	0	4429
PB 2019 Total	10	4329	100	0	0	0	0	0	0	4439
PB 2018 Total	10	4329	100	0	0	0	0	0	0	4439
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1998	--	--	--	--	--	--	49.8
1999	--	--	--	--	--	--	122.4
2000	--	--	--	--	--	--	164.2
2001	--	--	--	--	--	--	105.4
2002	--	--	--	--	--	--	63.0
2003	--	--	--	--	--	--	57.3
2004	--	--	--	--	--	--	19.8
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	--
2010	--	--	--	--	--	--	--
2011	--	--	--	--	--	--	--
2012	--	--	--	--	--	--	--
2013	--	--	--	--	--	--	--
2014	--	--	--	--	--	--	2.4
2015	--	--	--	--	--	--	10.1
2016	--	--	--	--	--	--	21.8
2017	--	--	--	--	--	--	25.6
2018	--	--	--	--	--	--	20.0
2019	--	--	--	--	--	--	4.8
2020	--	--	--	--	--	--	4.1
Subtotal	10	--	--	--	--	--	670.7

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 1999 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1998	--	--	--	--	--	--	49.9
1999	--	--	--	--	--	--	121.3
2000	--	--	--	--	--	--	160.3
2001	--	--	--	--	--	--	101.5
2002	--	--	--	--	--	--	60.1
2003	--	--	--	--	--	--	53.9
2004	--	--	--	--	--	--	18.1
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	--
2010	--	--	--	--	--	--	--
2011	--	--	--	--	--	--	--
2012	--	--	--	--	--	--	--
2013	--	--	--	--	--	--	--
2014	--	--	--	--	--	--	1.8
2015	--	--	--	--	--	--	7.5
2016	--	--	--	--	--	--	16.0
2017	--	--	--	--	--	--	18.5
2018	--	--	--	--	--	--	14.2
2019	--	--	--	--	--	--	3.3
2020	--	--	--	--	--	--	2.8
Subtotal	10	--	--	--	--	--	629.2

Annual Funding 1507 | Procurement | Weapons Procurement, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2002	25	45.7	--	24.0	69.7	2.4	72.1
2003	377	420.5	--	13.7	434.2	2.9	437.1
2004	322	344.5	--	--	344.5	7.4	351.9
2005	298	268.5	--	--	268.5	8.7	277.2
2006	409	362.7	--	--	362.7	9.9	372.6
2007	355	343.3	--	--	343.3	7.7	351.0
2008	496	469.1	--	--	469.1	5.0	474.1
2009	207	274.5	--	--	274.5	5.0	279.5
2010	196	268.0	--	--	268.0	6.3	274.3
2011	417	541.3	--	--	541.3	7.1	548.4
2012	196	266.5	--	--	266.5	9.9	276.4
2013	211	287.8	--	--	287.8	5.8	293.6
2014	214	301.4	--	--	301.4	6.1	307.5
2015	261	327.3	--	--	327.3	6.6	333.9
2016	149	195.5	--	--	195.5	6.8	202.3
2017	196	274.0	--	--	274.0	23.5	297.5
2018	100	172.7	15.8	13.7	202.2	4.6	206.8
2019	--	--	28.4	15.1	43.5	2.6	46.1
2020	--	--	29.5	--	29.5	3.1	32.6
2021	--	--	31.8	--	31.8	3.4	35.2
2022	--	--	62.1	--	62.1	4.7	66.8
2023	--	--	56.0	--	56.0	1.7	57.7
2024	--	--	57.0	--	57.0	1.7	58.7
2025	--	--	58.0	--	58.0	1.8	59.8
2026	--	--	59.0	--	59.0	1.8	60.8
2027	--	--	60.1	--	60.1	1.8	61.9
2028	--	--	61.2	--	61.2	1.9	63.1
2029	--	--	62.3	--	62.3	1.9	64.2
2030	--	--	63.4	--	63.4	1.9	65.3
2031	--	--	64.6	--	64.6	2.0	66.6
2032	--	--	65.7	--	65.7	2.0	67.7
2033	--	--	66.9	--	66.9	2.0	68.9
2034	--	--	15.2	--	15.2	2.1	17.3
2035	--	--	--	--	--	2.1	2.1
2036	--	--	--	--	--	2.2	2.2
Subtotal	4429	5163.3	857.0	66.5	6086.8	166.4	6253.2

Annual Funding 1507 | Procurement | Weapons Procurement, Navy							
Fiscal Year	Quantity	BY 1999 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2002	25	43.0	--	22.6	65.6	2.3	67.9
2003	377	388.1	--	12.6	400.7	2.7	403.4
2004	322	308.8	--	--	308.8	6.6	315.4
2005	298	234.2	--	--	234.2	7.6	241.8
2006	409	308.6	--	--	308.6	8.4	317.0
2007	355	285.9	--	--	285.9	6.4	292.3
2008	496	384.5	--	--	384.5	4.1	388.6
2009	207	221.8	--	--	221.8	4.1	225.9
2010	196	212.9	--	--	212.9	5.0	217.9
2011	417	422.0	--	--	422.0	5.6	427.6
2012	196	204.7	--	--	204.7	7.6	212.3
2013	211	218.0	--	--	218.0	4.4	222.4
2014	214	225.3	--	--	225.3	4.5	229.8
2015	261	241.0	--	--	241.0	4.9	245.9
2016	149	141.7	--	--	141.7	4.9	146.6
2017	196	195.2	--	--	195.2	16.7	211.9
2018	100	120.8	11.1	9.6	141.5	3.2	144.7
2019	--	--	19.4	10.4	29.8	1.8	31.6
2020	--	--	19.8	--	19.8	2.1	21.9
2021	--	--	21.0	--	21.0	2.2	23.2
2022	--	--	40.2	--	40.2	3.0	43.2
2023	--	--	35.5	--	35.5	1.1	36.6
2024	--	--	35.4	--	35.4	1.1	36.5
2025	--	--	35.4	--	35.4	1.1	36.5
2026	--	--	35.2	--	35.2	1.1	36.3
2027	--	--	35.2	--	35.2	1.1	36.3
2028	--	--	35.2	--	35.2	1.1	36.3
2029	--	--	35.1	--	35.1	1.1	36.2
2030	--	--	35.1	--	35.1	1.0	36.1
2031	--	--	35.0	--	35.0	1.1	36.1
2032	--	--	34.8	--	34.8	1.1	35.9
2033	--	--	34.9	--	34.9	1.0	35.9
2034	--	--	7.7	--	7.7	1.1	8.8
2035	--	--	--	--	--	1.1	1.1
2036	--	--	--	--	--	1.1	1.1
Subtotal	4429	4156.5	506.0	55.2	4717.7	123.3	4841.0

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	4/12/2001	8/26/2003
Approved Quantity	25	402
Reference	LRIP ADM	LRIP III Acquisition Strategy Report/Acquisition Plan (ASR/AP)
Start Year	2002	2002
End Year	2005	2007

Authority to act on LRIP-3 was granted by the Assistant Secretary of the Navy for Research, Development, and Acquisition on August 26, 2003, by way of a signed ASR/AP, vice an ADM. This ASR/AP served to support the FY 2003 Emergency Supplemental funding for 210 TACTOM All-Up-Round LRIP missiles to increase the total LRIP quantity to 402 missiles. Urgency was due to Operation Iraqi Freedom and the expenditure of a large number of Block III Tomahawk Missiles.

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost $M	Description
United Kingdom	9/24/2014	20	26.6	TTL TACTOM missiles were purchased in FY 2014; cost includes missiles and ancillary equipment. All UK missiles on contract have been delivered.
United Kingdom	3/11/2013	4	5.7	TTL TACTOM missiles were purchased in FY 2013; cost includes missiles and ancillary equipment. All UK missiles on contract have been delivered.
United Kingdom	2/10/2006	65	64.0	TTL TACTOM missiles were purchased in FY 2006; cost includes missiles and ancillary equipment. All UK missiles on contract have been delivered.

Notes

In October 2014, the UK submitted an LOR to procure 65 TACTOM TTL AUR from USN stock starting in FY 2015. An LOA for the 65 AURs was signed by the UK in March 2015. Ownership of the 20 AURs has been transferred to the UK.

Acronyms and Abbreviations

AUR - All-Up-Round
LOA - Letter of Offer an Acceptance
LOR - Letter of Request
TTL - Torpedo Tube Launch
UK - United Kingdom
USN - United States Navy

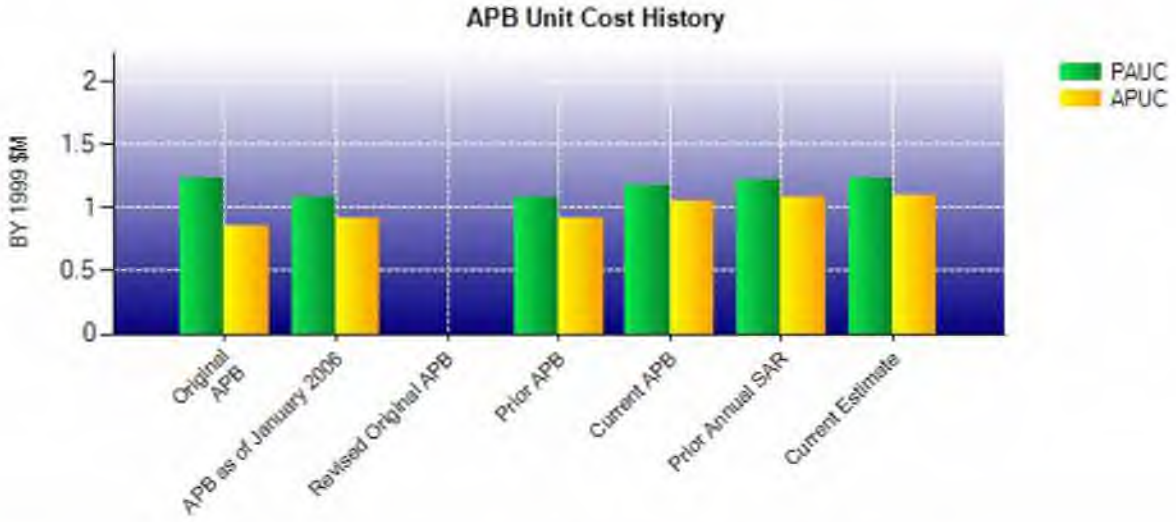
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 1999 $M Current UCR Baseline (Feb 2018 APB)	BY 1999 $M Current Estimate (Dec 2017 SAR)	% Change
Program Acquisition Unit Cost			
Cost	5406.2	5470.2	
Quantity	4439	4439	
Unit Cost	1.218	1.232	+1.15
Average Procurement Unit Cost			
Cost	4784.2	4841.0	
Quantity	4429	4429	
Unit Cost	1.080	1.093	+1.20

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 1999 $M Original UCR Baseline (Sep 1999 APB)	BY 1999 $M Current Estimate (Dec 2017 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1683.7	5470.2	
Quantity	1365	4439	
Unit Cost	1.233	1.232	-0.08
Average Procurement Unit Cost			
Cost	1158.4	4841.0	
Quantity	1353	4429	
Unit Cost	0.856	1.093	+27.69



APB Unit Cost History					
Item	Date	BY 1999 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Sep 1999	1.233	0.856	1.365	0.984
APB as of January 2006	Apr 2005	1.076	0.913	1.237	1.069
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Apr 2005	1.076	0.913	1.237	1.069
Current APB	Apr 2011	1.166	1.049	1.453	1.333
Prior Annual SAR	Dec 2016	1.218	1.080	1.539	1.393
Current Estimate	Dec 2017	1.232	1.093	1.560	1.412

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
1.365	-0.015	0.324	0.117	0.000	-0.716	0.000	0.104	-0.186	1.179

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
1.179	0.022	-0.186	0.057	0.016	0.444	0.000	0.028	0.381	1.560

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.984	-0.015	0.325	0.097	0.000	-0.520	0.000	0.104	-0.009	0.975

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.975	0.022	-0.111	0.057	0.016	0.425	0.000	0.028	0.437	1.412

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone II	N/A	Jun 1998	Jun 1998	Jun 1998
Milestone III	N/A	Jun 2003	May 2004	Aug 2004
IOC	N/A	Apr 2003	Mar 2004	May 2004
Total Cost (TY $M)	N/A	1863.4	3290.3	6923.9
Total Quantity	N/A	1365	2790	4439
PAUC	N/A	1.365	1.179	1.560

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	581.0	2709.3	--	3290.3
Previous Changes				
Economic	+0.1	+108.5	--	+108.6
Quantity	--	+1119.9	--	+1119.9
Schedule	--	+254.3	--	+254.3
Engineering	--	+69.0	--	+69.0
Estimating	+79.8	+1781.0	--	+1860.8
Other	--	--	--	--
Support	--	+127.1	--	+127.1
Subtotal	+79.9	+3459.8	--	+3539.7
Current Changes				
Economic	-0.2	-12.2	--	-12.4
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+10.0	+99.8	--	+109.8
Other	--	--	--	--
Support	--	-3.5	--	-3.5
Subtotal	+9.8	+84.1	--	+93.9
Total Changes	+89.7	+3543.9	--	+3633.6
CE - Cost Variance	670.7	6253.2	--	6923.9
CE - Cost & Funding	670.7	6253.2	--	6923.9

Summary BY 1999 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	564.9	2412.4	--	2977.3
Previous Changes				
Economic	--	--	--	--
Quantity	--	+818.1	--	+818.1
Schedule	--	+213.0	--	+213.0
Engineering	--	+50.2	--	+50.2
Estimating	+57.1	+1199.5	--	+1256.6
Other	--	--	--	--
Support	--	+91.0	--	+91.0
Subtotal	+57.1	+2371.8	--	+2428.9
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+7.2	+58.1	--	+65.3
Other	--	--	--	--
Support	--	-1.3	--	-1.3
Subtotal	+7.2	+56.8	--	+64.0
Total Changes	+64.3	+2428.6	--	+2492.9
CE - Cost Variance	629.2	4841.0	--	5470.2
CE - Cost & Funding	629.2	4841.0	--	5470.2

Previous Estimate: December 2016

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.2
Revised estimate for Navigation/Communications Modernization development integration. (Estimating)	+7.3	+10.1
Revised estimate to reflect the application of new outyear indices. (Estimating)	-0.2	-0.2
Adjustment for current and prior escalation. (Estimating)	+0.1	+0.1
RDT&E Subtotal	+7.2	+9.8

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-12.2
Revised estimate to align with new procurement strategy to utilize existing MK 14 canister inventory instead of procuring new or remanufactured canisters. (Estimating)	-4.7	-6.6
Revised estimate to reflect the application of new outyear indices. (Estimating)	+4.2	+7.2
Revised support equipment estimate for Mid-body Range Safety Subsystem kit production required to complete operational testing of the communications and navigation systems. (Estimating)	-2.0	-2.8
Revised estimate in FY 2022 and FY 2023 to include an additional 110 Navigation and Communications Modernization kits required to meet operational requirements within the FYDP. (Estimating)	+20.0	+31.2
Revised estimate to increase Navigation/Communication modernization kits to procure 255 per year FY 2024- FY 2033 to align to the TACTOM recertification acquisition strategy. (Estimating)	+37.1	+65.8
Adjustment for current and prior escalation. (Estimating)	+3.5	+5.0
Adjustment for current and prior escalation. (Support)	+0.3	+0.3
Decrease in Other Support associated with planned Flight Test Kit procurements. (Support)	-1.6	-3.8
Procurement Subtotal	+56.8	+84.1

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: BLK IV TACTOM FY14-15 FRP 11/12
Contractor: Raytheon Missile Systems
Contractor Location: 1151 East Hermans Road
Tucson, AZ 85747
Contract Number: N00019-14-C-0075
Contract Type: Firm Fixed Price (FFP)
Award Date: September 24, 2014
Definitization Date: September 24, 2014

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
251.1	N/A	231	512.3	N/A	331	539.0	539.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the award of the Composite Capsule Launching System, and an option exercise for 100 surface launched All-Up-Rounds (AUR).

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

The FY 2014 base contract was awarded for the procurement of 231 missiles at a price of $251.1M. The FY 2014 procurement includes 196 surface and subsurface launched AURs, 20 torpedo tube launched AURs as part of the United Kingdom Foreign Military Sales case, and 15 surface AURs (FY 2013 funded through Buy-to-Budget).

The FY 2015 option exercise for 100 surface AURs was awarded on January 29, 2015. A modification to this option was issued on February 26, 2015, which included 114 additional surface AURs. These missiles were funded by a mix of FY 2014 Buy-to-Budget and FY 2015 funds. This modification increased the contract by $90,601,839.46 to $506,979,383.46 (when awarded in February).

Current contract price includes United States Navy missiles and subsurface variant capsules.

Contract Identification

Appropriation: Procurement
Contract Name: BLK IV TACTOM FY16 FRP13
Contractor: Raytheon Missile Systems
Contractor Location: 1151East Hermans Rd.
Tucson, AZ 85756
Contract Number: N00019-17-C-0034
Contract Type: Firm Fixed Price (FFP)
Award Date: December 28, 2016
Definitization Date: December 28, 2017

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
303.8	N/A	214	569.2	N/A	410	569.2	569.2

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to adding FRP-14 option post initial contract award.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

The FY 2017 FRP-14 requirement for 196 Vertical Launch System missiles plus identified spares was awarded on November 3, 2017. The contract value has increased to $569.23M.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	10	10	10	100.00%
Production	4429	3999	4429	90.29%
Total Program Quantity Delivered	4439	4009	4439	90.31%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	6923.9	Years Appropriated	21
Expended to Date	5227.0	Percent Years Appropriated	53.85%
Percent Expended	75.49%	Appropriated to Date	6018.0
Total Funding Years	39	Percent Appropriated	86.92%

The above data is current as of March 13, 2018.

As of March 13, 2018, a total of 4,088 TACTOM missiles have been delivered, which includes 89 FMS missiles for the United Kingdom.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	January 11, 2018
Source of Estimate:	POE
Quantity to Sustain:	4439
Unit of Measure:	Total Quantity
Service Life per Unit:	30.00 Years
Fiscal Years in Service:	FY 2004 - FY 2050

In May 2017, the TACTOM O&S cost estimate was re-estimated to account for reduced O&M funding in the PB 2018 due to the reprogramming of TACTOM Recertification program funds from Navy O&M (O&MN), to Weapons Procurement, Navy (WPN). The Recertification effort has been officially designated an ACAT II program as of October 3, 2017, with no estimated changes to the overall O&S estimate for PB 2019.

The current cost estimate includes actual and projected cost for operation and sustainment of all 4,439 missiles, beginning in FY 2004, with cost estimate projections extending to FY 2050. The total service life of a TACTOM is anticipated to be 30 years, which includes the initial 15 years of warranty coverage after delivery and an additional 15 years of service life following recertification. The "Quantity to Sustain" (4,439 shown above) is the forecasted inventory anticipated to sustain beyond recertification for the second 15 years of life, which includes reductions across the life cycle for actual and projected missile expenditures. Actual O&S costs were utilized from FY 2004 through FY 2016, and the revised budget estimate covers FY 2017 through FY 2050.

The average annual O&S requirement in the PB 2019 FYDP has remained unchanged from last fiscal year since no change in quantity has occurred.

Sustainment Strategy

The sustainment strategy includes maintenance of the All-Up-Round (AUR) and an Operational flight test program to track Tomahawk Weapon System performance. TACTOM Sustainment Strategy is based on the original Tomahawk Program "Wooden Round" concept, which relies upon a 15 year missile warranty, and features limited missile maintenance outside of that provided by the Original Equipment Manufacturer (OEM). The total service life of a TACTOM is anticipated to be 30 years, which includes the initial 15 years of warranty coverage after delivery and an additional 15 years of service life following recertification. The OEM operates a TACTOM depot activity and is responsible for conducting the majority of the maintenance for TACTOM, of which efforts are largely covered by the 15 year warranty. The TACTOM recertification program is scheduled to begin inducting missiles in FY 2019. Organizational level maintenance is limited to visual inspections, missile inventory checks (surface only), alignment confidence checks (submarine only) and minor unscheduled maintenance (i.e. corrosion control). Intermediate level maintenance is limited to missile identification checks, receipt and transfer inspections, electrical continuity, and nitrogen pressure checks.

Antecedent Information

Block III Tomahawk is the antecedent system of TACTOM. Antecedent costs were derived from average annual actual cost spanning 24 years. The source of this data is the Block III Tomahawk budget. Peak inventory for Block III was 1,296 missiles. The Block III Tomahawk service life was also 30 years. Block III Tomahawk includes recertification O&S cost.

Annual O&S Costs BY1999 $M		
Cost Element	TACTOM Average Annual Cost Per Total Quantity	Tomahawk Block III (Antecedent) Average Annual Cost Per Total Quantity
Unit-Level Manpower	0.000	0.000
Unit Operations	0.000	0.000
Maintenance	0.000	0.000
Sustaining Support	34.090	36.600
Continuing System Improvements	0.000	0.000
Indirect Support	0.000	0.000
Other	0.000	65.400
Total	34.090	102.000

The Other cost included in the table for Tomahawk Block III is for recertification.

Item	Total O&S Cost $M			
	TACTOM			Tomahawk Block III (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	1568.2	1725.0	1568.2	3058.4
Then Year	2531.3	N/A	2531.3	N/A

Equation to Translate Annual Cost to Total Cost

Average Annual Cost Per Total Quantity = Total O&S Cost / Inventory Service Life
$34.09M = $1,568.2M / 46

O&S Cost Variance		
Category	BY 1999 $M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2016 SAR	1568.2	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	1568.2	

Disposal Estimate Details

Date of Estimate:	January 11, 2018
Source of Estimate:	POE
Disposal/Demilitarization Total Cost (BY 1999 $M):	Total costs for disposal of all Total Quantity are 50.1

The U.S. Army has responsibility for disposal of all ordnance.